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PATENT AND TECHNICAL TRANSLATION

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*GERMAN AND FRENCH TO ENGLISH
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DECLARATION

The undersigned, Olaf Bexhoeft, hereby states that he is well acquainted with both the English and German languages and that the attached is a true translation to the best of his knowledge and ability of the German text of PCT/EP2004/01332, filed 12/14/2004, and published on 06/30/2005 under No. WO 2005/058601 A2, and of sixty-five (65) amended claims.

The undersigned further declares that the above statement is true; and further, that this statement was made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or document or any patent resulting therefrom.

Olaf Bexhoeft

Specification

Printing Blanket Having a Dimensionally Stable Carrier Plate, a Method for Producing a Printing Blanket of this Type, and a Printing Unit for a Printing Machine Without a Damping Unit

The invention relates to a printing blanket having a dimensionally-stable support plate, a method for producing such a printing blanket, as well as a printing group for a printing press without a dampening unit, in accordance with the preamble of claims 1, 28 or 31.

Some printing groups operate without dampening agents and in this way are particularly suited to waterless web offset printing. When printing without dampening agents, a printing plate which permits the transfer of the print image without dampening agents is fastened to the plate cylinder of the printing group. For this purpose the printing plate has a lower layer of an ink-absorbing material and an upper layer of an ink-repelling material. Ink-repelling at the upper layer takes place here without dampening agents. Accordingly, special materials are required for producing the upper layer, silicon-containing materials in particular have shown themselves to be suitable for ink-repelling without dampening agents.

The upper, and therefore ink-repellent layer of the printing plate has openings in the areas of the print image which are to be printed, so that the printing ink can collect on the ink-absorbing layer located underneath it. In connection with printing groups of the species, the print image can be transferred in this way to a downstream-located transfer cylinder, for example

a rubber blanket cylinder. The upper layer covers the lower layer in the areas of the print image which are not to be printed, so that no printing ink is transferred in these areas.

A printing group for waterless offset printing is described in WO 03/045695 A1, for example.

EP 0 182 156 B1 discloses a rubber blanket cylinder with an area whose radius has been reduced.

If several printing plates are fastened on the plate cylinder one behind the other with ends facing each other, the problem arises in connection with planographic printing without a dampening agent that the ends of the printing plates are often also being printed, at least lightly, even though the ends are located in an area of the print image which actually should not be printed.

The object of the invention is based on producing a printing blanket with a dimensionally-stable support plate, a method for producing such a printing blanket, as well as a printing group for a printing press without a dampening unit.

In accordance with the invention, this object is attained by the characteristics of claims 1, 28 or 31.

A particular advantage of the printing group lies in that depressions on the shell face of the transfer cylinder are placed opposite the ends of the printing plates and extend parallel with the longitudinal axis of the transfer cylinder. An ink transfer from the ends of the printing plates to the transfer cylinder is prevented in this way. As a result the ends of the printing plates are therefore not imprinted, even in connection with planographic printing without dampening agents, since an ink transfer to this area is not possible because of the depressions in the transfer cylinder.

The way in which the transfer cylinder is structurally designed is basically open to choice. In accordance with a preferred embodiment, the transfer cylinder has a printing blanket with a dimensionally-stable support plate and a coating fixed on the support plate. The ends of the support plate can be fixed in place on the transfer cylinder for fastening the printing blanket. The shell face of the transfer cylinder is constituted by the outside of the coating.

A depression in the transfer cylinder can be constituted by the spacing between the leading end and the trailing end of the printing blanket, in particular by the distance between the leading lateral edge and the trailing lateral edge of the coating of the printing blanket.

In addition to this, the coating can have a groove worked into the coating of the printing blanket located between the leading end and the trailing end of the printing blanket, in particular between the leading lateral edge and the trailing lateral edge of the coating of the printing blanket, in particular approximately centered between these two lateral edges. Here, the depth of the groove should preferably correspond to 5% to 15% of the thickness of the coating.

Alternatively to the use of a printing blanket with a support plate, printing blankets are also conceivable, whose actual ends are fixed on the transfer cylinder. With such printing blankets a depression can be formed by means of the distance between the leading and the trailing suspension edge of the printing blanket. It is furthermore also possible to work a groove into the printing blanket for forming the depression. If an underlayer is provided between the printing blanket and the transfer cylinder, the underlayer can have at least one break or a

reduction of the cross section for forming the depression on the outer circumference of the printing blanket.

The width of the depression in the circumferential direction should approximately correspond to 0.1% to 1% of the length of the printing blanket in the circumferential direction.

It is of particular advantage when the plate cylinder and/or the transfer cylinder can be temperature-controlled, because the ink transfer process of the ink free of the dampening agent can be better controlled by means of the temperature control. The invention will be explained by way of example in what follows by means of the embodiments represented in the drawings.

Shown are in:

Fig. 1, a plate cylinder and a transfer cylinder of a printing group operated without a dampening agent in a perspective plan view,

Fig. 2, five processing steps for producing the ink-transferring printing plates of the printing group in accordance with Fig. 1,

Fig. 3, the printing group in accordance with Fig. 1 in cross section,

Fig. 4, an enlarged portion of the cross section of the printing group in accordance with Fig. 3,

Fig. 5, the printing blanket of the transfer cylinder in accordance with Fig. 1 in a plan view from the front,

Fig. 6, the printing blanket in accordance with Fig. 5 in cross section,

Fig. 7, a second embodiment of a transfer cylinder with a second embodiment of a printing blanket in cross section,

Fig. 8, in another embodiment the printing blanket of the transfer cylinder in a front view,

Fig. 9, the printing blanket in accordance with Fig. 8 in cross section,

Fig. 10, an enlarged portion of a depression in the printing blanket,

Fig. 11, a further exemplary embodiment,

Figs. 12 to 14, process steps for producing a printing blanket unit.

A portion of a printing group 01 with a plate cylinder 02 and a transfer cylinder 03 placed against the latter is shown in a perspective plan view in Fig. 1. Respectively two printing plates 04, in particular planographic printing plates 04, have been fastened one behind the other in the circumferential direction to the circumference of the plate cylinder 02 side-by-side in four rows, so that a total number of eight printing plates 04 on the plate cylinder 02 results as a whole. The printing plates 04 transfer the desired print image by means of planographic printing without a dampening agent to the circumferential face of the transfer cylinder 03, from where it is transferred, for example to a web of material to be imprinted, by offset printing.

The production of the circumferential layer on the printing plates 04 which transfers the ink will be briefly explained in what follows by means of the five sketches in Fig. 2 which, by way of example, represent the individual steps for producing a printing plate 04 operating without dampening agent.

As can be seen from Fig. 2a, the printing plate 04 is constructed from a support layer 06, for example of aluminum, an ink transfer layer 07 made of an ink transfer material, an ink-

repelling layer 08 made of an ink-repelling material, for example silicon, and a protective layer 09. For transferring the desired print image to the printing plate 04, the latter is exposed with the use of a positive film 11, for example, containing the print image (Fig. 2b). UV light in particular can be used for the exposure process. The ink-repelling layer 08 is detached in a locally limited manner at the exposed locations of the printing plate 04 (Fig. 2c) and can be removed in sections by means of suitable solvents. As a result the ink-repelling layer 08 then covers the ink transfer layer 07 at the places of the print image which are not intended to be imprinted later (Fig. 2d). The ink-repelling layer 08 has openings 12 at the places of the print image which are to be printed. In the course of the printing process the ink 13 can be deposited on the ink transfer layer 07 in the area of the openings 12 and can in this way be transferred to the downstream-connected transfer cylinder 03 (Fig. 2e). As a result a transfer free of dampening agent of the ink 13 is possible in this way. Of course, other manufacturing processes for producing printing plates operating without dampening agents are also known and usable.

As can be seen from the cross section represented in Fig. 3, a printing blanket 14 has been clamped over the circumference of the transfer cylinder 03. A depression 15 in the transfer cylinder 03 is formed by the spacing between the leading end and the trailing end of the printing blanket 14.

The plate cylinder 02 has conduits 16, through which a temperature-controlled fluid can flow in order to control the temperature of the plate cylinder 02 from the inside. The contact zone between the plate cylinder 02 and the transfer cylinder 03 in which the printing plates 04, which are arranged one behind the

other, come into contact with the printing blanket 14 for transferring ink is represented enlarged in Fig. 4.

As can be seen from Fig. 4, the printing plates 04 arranged one behind the other are respectively fixed in place on the plate cylinder 02 by means of fastening strips 18. In the area of the circumference on which the ends 17 of the printing plates 04 roll off, the printing blanket 14 has a depression 19, so that no ink is transferred to the printing blanket 14 in the area of the ends 17.

The structure of the printing blanket 14 is represented in Fig. 5 and Fig. 6. This printing blanket should preferably be employed in a printing unit described in DE 103 11 285 A or DE 198 03 809 A. A multi-layered coating 22 made of rubber has been vulcanized onto a dimensionally-stable support plate 21 made of special steel. The depression 19 is constituted by a groove which is arranged approximately centered between the leading lateral edge 23 and the trailing lateral edge 24 of the coating 22. The depth 26 of the depression 19 is approximately 10% of the thickness of the coating 22. The width 27 of the depression 19 is approximately 0.5% of the effective length of the printing blanket 14 which, in the present embodiment, corresponds to the length of the coating 22 in the circumferential direction.

A second embodiment of a transfer cylinder 28 with a printing blanket 29 fastened on it is represented in cross section in Fig. 7. The ends of the printing blanket 29 are fastened in a groove on the transfer cylinder 28. An underlayer 31 is arranged between the outer circumference of the transfer cylinder 28 and the inner circumference of the printing blanket 29. In the area located opposite the fastening groove for fixing the ends of the printing blanket 29 in place, the underlayer 31 has a break, so

that a depression 32 is formed in this way at the outer circumference of the printing blanket 29.

In place of the underlayer 31, the shell face of the transfer cylinder 28 can have a break.

In a further embodiment in accordance with Figs. 8 and 9, a depression 19 has been cut as a deformation into the support plate 21 of the printing blanket 14, i.e. at the location in which the depression 19 has been formed in the support plate 21. The depression 19 is a dimensionally-stable deformation.

In a first variation, this deformation is pressed by means of a die, for example a lower die 33, into the support plate 21. The depression 19 is made in the support plate 21 by means of an upper die 34 and a lower die 33. In place of the deformation, the thickness of the support plate 21 can also be reduced.

The depression 19 has a sweep of approximately 0 mm to 1 mm. The width 27 is approximately 3 mm to 8 mm, wherein the depth lies at approximately 0.1 mm to 0.5 mm, in particular approximately 0.2 mm to 0.3 mm.

Advantageously the depression 19 is applied to the support plate 21 prior to the application of the printing blanket 14 to the dimensionally-stable support plate 21 and prior to the application of the printing blanket 14 to the transfer cylinder 03. In another embodiment the depression 19 is applied to the support plate 21 when the printing blanket 14 has already been applied to the support plate 21.

In a further embodiment, as represented in Fig. 10, not only do the printing blanket 14 and the support plate 21 have depressions 19, but the transfer cylinder 03 has a depression 36 in this area, which has been cut into the barrel of the transfer cylinder 03.

If the transfer cylinder 28 has an underlayer 32, for example a glued-on foil, the depression 32 is applied to, or between the underlayer 32 and the barrel of the transfer cylinder 28 (Fig. 11). As can be easily seen in Figs. 9 and 11, the two ends 17 of the printing plate 04 roll off on the depression 19, 32.

The exemplary embodiments can also be transferred to transfer cylinders 03, 28 on which two printing blankets 14, 29 are arranged in the axial direction. In this case the depressions 19, 32 are arranged offset, for example by 180°, in the circumferential direction.

A plate cylinder 02 can also work together with the transfer cylinder 03, 28, wherein a circumference of the transfer cylinder 03, 28 is a whole number multiple of the circumference of the plate cylinder 02. In a preferred embodiment, the circumference of the plate cylinder 02 has one printing plate 04 and four printing plates 04 in the axial direction. A dampening unit can be assigned to the plate cylinder 02.

A preferred production method (Figs. 12 to 14) of the printing blanket will be described in what follows:

Prior to its application to a transfer cylinder 03 arranged in a printing press, the dimensionally-stable support plate 21, together with the printing blanket 14, is deformed with the aid of a lower die 33 and an upper die 34 for producing a depression 19.

To this end, the printing blanket unit 37, consisting of the support plate 21 and the printing blanket 14, is inserted into a device 38. Essentially this device 38 has a support 39, at least one, or several, hold-down devices 41, two movable, for example pivotable, bending strips 42, the upper die 34 and the lower die 33. The hold-down devices 41, bending strips 42 and the

upper die 34 are for example respectively moved by a work cylinder 43, for example a pneumatic cylinder 43.

Initially, with the bending strips 42 open, the printing blanket unit 37 is placed on the support 39 of the device 38 and is fixed in place there by means of the hold-down devices 41 (Fig. 12). Subsequently, the ends of the support plate 21 are preferably first bent by pivoting the bending strips 42 (Fig. 13), and thereafter the depression 19 is formed in the printing blanket unit 37 by means of the upper die 34 (Fig. 14).

List of Reference Symbols

01	Printing group
02	Plate cylinder
03	Transfer cylinder
04	Printing plate, planographic plate
05	-
06	Support layer
07	Ink transfer layer
08	-
09	Protective layer
10	-
11	Positive film
12	Opening
13	Ink
14	Printing blanket
15	Depression
16	Conduit
17	End (04)
18	Fastening strip
19	Depression, groove
20	-
21	Support plate
22	Coating
23	Leading lateral edge
24	Trailing lateral edge
25	-
26	Depth (19)
27	Width (19)

28	Transfer cylinder
29	Printing blanket
30	-
31	Underlayer
32	Depression
33	Die, lower die
34	Upper die
35	-
36	Depression (03)
37	Printing blanket unit
38	Device
39	Support
40	-
41	Hold-down device
42	Bending strip
43	Work cylinder, pneumatic cylinder